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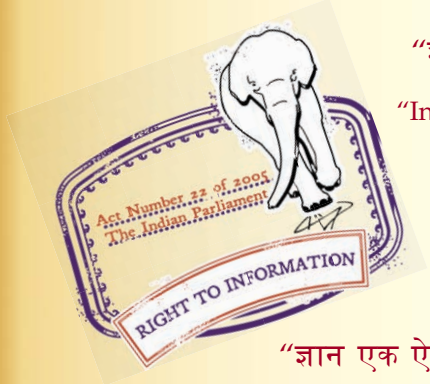
IS 10580 (1983): Service conditions for electrical equipment [ETD 1: Basic Electrotechnical Standards]

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"Knowledge is such a treasure which cannot be stolen"

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# *Indian Standard*

# SERVICE CONDITIONS FOR ELECTRICAL EQUIPMENT

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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# *Indian Standard*

# SERVICE CONDITIONS FOR ELECTRICAL EQUIPMENT

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# *Indian Standard*

# SERVICE CONDITIONS FOR ELECTRICAL EQUIPMENT

## 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 27 May 1983, after the draft finalized by the Basic Electrotechnical Standards Sectional Committee had been approved by the Electrotechnical Division Council.

**0.2** The safe and reliable operation of an electrical equipment is achieved by ensuring, amongst other things, that the equipment is properly designed for the service or operating conditions in which it is envisaged to be used. These conditions individually or collectively might influence the operating characteristics of equipment and are those in which the safe and reliable operation is expected.

**0.3** The service conditions defined in product specifications normally include the ambient temperature, altitude of installation, atmospheric pressure, wind pressure, etc. In addition, environmental severities such as corrosive atmosphere, dust, fumes, etc, and mechanical severities such as shock and vibration are also to be accounted for in laying down the service conditions.

**0.4** Over the years, a convention has been established to define these service conditions in the standards, wherever required, in order to draw attention to the fact that the characteristics of the equipment would vary, should these conditions change substantially. Quite a few standards, also specify the correction factors to be applied by the application engineer to the various parameters wherever the conditions differ from the normal service conditions. All these factors put together help the user to a large extent in making best use of the equipment.

**0.5** It is however understood that for some electrical equipment, some of the factors of service conditions listed in **3.1** may not be of consequence as far as the performance is concerned. Individual standards are therefore required to specify such of those factors which are likely to influence the performance, along with their limiting values. In addition, wherever some factors are unrelated to performance or an equipment is capable of withstanding wider environmental limits, the same may be stated in the product specification.

**0.6** Different specifications in the electrotechnical field, in many cases may use different terminologies in specifying the service conditions. The emphasis to be laid on normal conditions vis-a-vis the special service conditions which may require special tests to be carried out has not been clearly brought out in this standard. Moreover, additional environmental severities which also require additional tests to be done are not always recognized or distinguished. This standard serves as a guide in this regard, ensuring uniformity amongst the various equipment specifications.

**0.7** It is not intended that the service conditions given in this specification are to be uniformly adopted for all electrical equipment. However it is felt that the conditions required to be specified would fall into the three broadly classified categories specified herein, to enable the implications better understood. It would also enable the various committees to start with a common terminology and make departures only when necessary and unavoidable. It is recommended that the reasons for the departures, when made, shall be indicated in the individual specifications to enable the peculiarities of the equipment and the conditions of its use to be better understood.

**0.8** This standard is intended to serve as a guide for Technical Committees in specifying service conditions and is not meant to be utilized by product users directly. For the product users, the guidance on service conditions and criteria of conformity shall be as defined in individual standards.

**0.9** This standard recognizes the fact that for any electrical equipment, the service conditions could be the 'normal service conditions' specified or referred to in the individual specifications to which satisfactory operation is ensured, 'special service conditions' which are to be specifically defined by the purchaser towards which special tests are demanded on agreement and the 'abnormal service conditions' wherein, extremes of normal conditions as well as abnormal severities of environment, not normally encountered, these are defined here ( *see* **2** ).

**0.10** In many instances, it may be possible to use the equipment intended for 'normal service conditions' at 'abnormal service conditions' with suitable correction factors. These correction factors depend on several criteria such as the nature of use of equipment, condition of installation, etc. This standard does not cover criteria for derating which fall under the purview of individual product standards.

## 1. SCOPE

**1.1** This standard specifies the service conditions of use for electrical equipment.

## 2. TERMINOLOGY

**2.0** For the purpose of this standard, the definitions given below shall apply.

**2.1 Normal Service Conditions** — Normal service conditions are those conditions which are commonly encountered in the use of bulk of the electrical equipment, to which, unless specified otherwise, the requirements in the relevant Indian standards relate.

**2.2 Abnormal Service Conditions** — Abnormal service conditions are those which are modifications to or extremes of, normal service conditions.

NOTE — Equipment designed for normal service conditions may require the use of correction factors or adoption of special precautions, when they are used for abnormal service conditions.

**2.3 Special service Conditions** — Special service conditions are specified in addition to normal service conditions and are required for use of equipment for special applications.

## 3. NORMAL SERVICE CONDITIONS

**3.1** Electrical equipment conforming to relevant Indian standards, unless specified otherwise, are intended for use under the normal service conditions given below:

a) Reference ambient temperatue not exceeding 40°C;

NOTE 1 — The standard ambient temperature conditions assumed for the purpose of reference ambient temperature of 40°C are :

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| 1) Maximum ambient air temperature not exceeding | 45°C, |
| 2) Maximum daily average ambient air temperature not exceeding | 35°C, |
| 3) Maximum yearly average ambient air temperature not exceeding | 30°C, and |
| 4) Minimum ambient temperature | −5°C. |

NOTE 2 — Reference is drawn to IS : 9676-1980* wherein the basic assumptions made in deciding the values of standard ambient conditions of temperature and the basis for arriving at reference ambient temperature of 40°C has been explained.

b) Relative humidity not exceeding 95 percent;

c) Atmospheric pressure not exceeding 1013 m bar ( $10^2$Pa );

d) The altitude not exceeding 1 000 m;

NOTE — In case the equipment is suitable for operation at altitude beyond 1 000 m, the next preferred value of not exceeding 2 000 m is recommended for adoption.

*Reference ambient temperature for electrical equipment.

e) Ambient air not materially polluted by dust, smoke corrosive or flammable gases and vapours or salts;

f) Ice coating for outdoor equipment not exceeding 5 kg/m$^2$;

g) For outdoor equipment, the wind pressure not exceeding 700 Pa;

NOTE — For guidance on basic maximum wind pressure in various parts of India, *see* IS : 5613 ( Part 1/Sec 1 )-1970*.

h) No earth tremors of any consequence;

NOTE — For guidance on siesmic zones in India, *see* IS : 1893-1975†.

j) For indoor installations, only the normal condensation is present.

NOTE — In addition to the factor mentioned above, factors relating to operating conditions such as specified/rated load, rated electrical input parameters and rated duty, are also considered important for satisfactory performance of the equipment. However in the context of this standard conformity to such factors is implied.

## 4. ABNORMAL SERVICE CONDITIONS

**4.1** For the purpose of electrical equipment, abnormal service conditions shall be those, which are modifications to or extremes of normal service conditions defined in **3.1** (a) to (h).

NOTE 1 — For limits of abnormal service conditions which can be tolerated for a specific electrical equipment, guidance shall be provided in individual product standards.

NOTE 2 — Correction factors to be employed for specific equipment in respect of use in abnormal service conditions, and special precautions, if any, required in selection, installation and use shall be covered in individual product standards.

## 5. SPECIAL SERVICE CONDITIONS

**5.1** Special service conditions where required, shall be specified, conformity to which are ascertained by the tests specified as 'special tests' in individual product standards.

**5.2** These service conditions, shall be in addition to those specified in **3**, and shall be subject to agreement between the user and the manufacturer for specific type of equipment or for equipment for particular application.

**5.3** Unless specified otherwise, equipment conforming to performance requirements under special service conditions shall also be tested for other tests specified for normal service conditions, as they are not necessarily mutually exclusive.

**5.4** In view of a variety of special applications that may exists and the large number of equipment involved, the special service conditions are neither enumerated nor being quantified in this standard.

*Code of practice for design, installation and maintenance of overhead power lines: Part 1 Lines up to and including 11 kV, Section 1 Design.

†Criteria for earthquake resistant design of structures ( *third revision* ).

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